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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,049	11/13/2001	Masazumi Amagai	TI-33622	2810

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EXAMINER

LE, DUNG ANH

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 01/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/008,049

Applicant(s)

AMAGAI ET AL.

Examiner

DUNG A LE

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 18-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 14-17 is/are rejected.
- 7) ☒ Claim(s) 9-13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Election/Restriction

Application's election **without traverse** of Group II (Claims 1-17) in Paper No. 6 drawn to process of making a semiconductor device is acknowledged for prosecution in the subject application . Applicants have the right to file a divisional, continuation or continuation-in-part application covering the subject matter of the non-elected claims 18-21.

Claim Rejections

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Miyaake et al. (6333466) in view of Chung (6376769).

Regarding claim 1, Miyaake et al. disclose a multilayer composite attachment film for use in assembling semiconductor devices, comprising:

a metal foil M (see fig. 1) having first and second surfaces; and an adhesive layer attached on each of surfaces Cad/BAd;

whereby multilayer composite has an average modulus (col 2, lines 45-48).

Miyaake et al. do not teach a multilayer composite has an average modulus greater than the modulus of a polymerized encapsulation material.

Chung discloses a multilayer composite has an average modulus greater than the modulus of a polymerized encapsulation material 137 in figs. 7-9 (col. 11, lines 7-11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a multilayer composite has an average modulus greater than the modulus of a polymerized encapsulation material., as taught by Chung in order to obtain the best chip-scale semiconductor package.

Regarding claim 2, column 2, line 37-47 of Miyaake et al. show material foil of composite is a copper foil in the thickness range from about 30 to 150 um and having a modulus of approximately 200 GPa.

Regarding claim 3, metal foil of composite may be any metal, including nickel, zinc, and aluminum, with a modulus so that the composite modulus is greater than the modulus of the selected molding compound in column 2, line 37-40 of Miyaake et al.

Regarding claims 4 and 5, adhesive layers of composite are epoxy resin and acrylic resin blends in the thickness range from about 10 to 50 um column 3, line 42-44 of Miyaake et al. and the modulus of adhesive layers are selected so that multilayer composite including metal foil has an average modulus greater than the modulus of a polymerized encapsulation material column 11, lines 7-10 in Chung.

Claims 6-17 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Chung (6376769) in view of) Miyaake et al. (6333466).

Regarding claims 6, 7, 16 and 17, Chung discloses a semiconductor device comprising:
a semiconductor chip 120 having an active and a passive surface, passive surface adhesively attached to a substrate film 110 by means of a multilayer composite (fig. 3); composite comprising a metal foil 114 having first and second surfaces, and an adhesive layer attached on first (upper surface of layer 114) surface.

Chung does not disclose the second surface attached to adhesive layer.

However, Miyaake et al. teach a metal foil M (see fig. 1) having first and second surfaces; and an adhesive layer attached on each of surfaces Cad/Bad.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the second surface attached to adhesive layer, as taught by Miyaake et al. in order to provide on both surfaces of metal foil with adhesive layer and exhibit an average complex shear modulus.

Regarding claim 8, adhesive layer between chip and first surface of metal foil is between 10 and 30 um thick, nonultraviolet curable, and having a modulus of approximately 1 GPa.

Regarding claims 14 and 15, Chung in fig 7 shows a protective encapsulation, encapsulation enclosing active chip surface, bonding wires, and portions of first surface of composite and encapsulation is provided by molding compound, having a modulus of approximately 20 to 26 Gpa (col. 11, lines 7-12).

Reasons for Indication of Allowable Subject Matter

Claims 9 and 10- 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the

claimed limitations. Chung (6376769) in view of) Miyaake et al. (6333466), taken individually or in combination, do not teach the claimed invention having adhesive layer between second surface of metal foil and support film is between 20 and 50 pm thick, ultraviolet curable, and having a modulus of approximately 1 Gpa (**Regarding claim 9**) and substrate film is an insulator including polyimide in the thickness range of about 100 um, integral with at least one layer of electrically conductive routing lines, a first plurality of terminals facing in the direction towards the chip, and a second plurality of terminals facing in the direction away from the chip (**Regarding claim 10**).

If Applicants are aware of better art than that which has been cited, they are required to call such to attention of the examiner.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is 703-306-5797. The examiner can normally be reached on Monday-Friday 8:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 703-308-4910. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Dung A. Le
Examiner

